data-sequence channels" in the preceding paragraph. This change to claim 16 also should not alter claim scope. It is submitted that the amendments to claim 16 do not raise any new issues, which might require further search or consideration, by the Examiner.

Although it does not alter the claim scope, the amendment to move the header language to a separate paragraph may help to make clearer what is believed to be a patentable distinction over the art applied in the final Office Action, as discussed later. The amendment was not earlier presented because the Examiner had previously rejected the claims over a somewhat different combination of prior art. The rejections in the December 4, 2002 Office Action were the first applications of U.S. Patent No. 5,404,377 to Moses. In fact, that newly applied patent was not of record in this case before the Examiner mailed the final Office Action. For these reasons, it is believed that entry of the amendments to claim 16 are appropriate under 37 C.F.R. § 1.116. Prompt entry and favorable consideration of amended independent claim 16 are solicited.

Claims 16-50 are pending in this application, and all of the claims stand rejected. The rejections of the claims are based on combinations of prior art references. It is believed, however, that the claims patentably distinguish over the art. A summary of the rejections and a detailed explanation of the patentability of the claims are set forth below.

The Latest Art Rejections

Claims 16, 20-27, 31-38 and 42-50 stand rejected under 35 U.S.C. § 103 as unpatentable over U.S. Patent No. 5,166,951 to Schilling in combination with U.S. Patent No. 5,404,377 to Moses. The previously applied the Schilling '951 Patent discloses a spread-spectrum data transmission technique, in which data at a transmitter is demultiplexed into sub-data-sequence signals. Each sub-data-sequence signal is spread-spectrum processed into a spread-spectrum signal. These spread-spectrum signals are then combined with each other and with a chip-code

signal and sent over a common communications channel. The Examiner acknowledges that the Schilling '951 Patent does not teach adding a header-symbol-sequence signal that is spread-spectrum processed with a chip-sequence signal, by concatenating such a header with the combined spread-spectrum channel signals, as in the independent claims.

The newly cited Moses Patent discloses a technique for spreading a data signal in such a manner as to allow communication thereof over a channel carrying audio information, that is to say, so that the data signal is not perceptible to a person listening to the audio. The disclosed technique provides different data transmission/encoding depending on differences in the audio signal, to provide an optimum transmission that remains imperceptible, under varying conditions of the audio signal (defined by variations of the "perceptual entropy envelope" of the audio signal). Of note for purposes of discussion here, Moses provides a header signal for each frame of data. However, Moses uses three different header generators 232, 242, 256 to add the header to the same data from the RAMs, depending on which of the three encoders 220, 222, 224 is used for each given transmission. As such, Moses separately inserts a header into in each separate substream (channel).

The Examiner cited Moses for its disclosure of the header generator 232 in the wideband spread-spectrum encoder 220. The direct sequence signal output from the modulo-2 encoder 228 goes to the input of the header signal generator 232. As stated in the patent, the header signal generator 232 adds a PN code header signal to each frame of spread data, in accord with synchronization and timing signals from circuit 234. Attention is directed to column 7, lines 10-24. The cited header generator 232 provides a header on only one stream of spread data. The Examiner, however, asserted that it would have been obvious to add a header ala Moses to the transmissions of Schilling '951, to enhance "the system with higher efficiency," apparently concluding that addition of such a header was enough to meet the claim limitations.

Claims 17-19, 28-30 and 39-41 stand rejected under 35 U.S.C. § 103 as unpatentable over Schilling '951 in view of Moses, further in combination with U.S. patent No. 5,260,967 to Schilling (hereinafter the '967 patent) and U.S. patent No. 5,619,526 to Kim (hereinafter the '256 patent). The Examiner cited the Schilling '967 patent and the Kim '256 patent in support of an assertion that it would have been obvious to add means for encoding, scrambling or encrypting to the new basic combination of Schilling '951 and Moses.

Patentability

The art rejections are respectfully traversed. Each of the three independent claims specifies a header comprising a header-symbol-sequence signal spread-spectrum processed with a chip-sequence signal. Although the scope varies somewhat, each of the independent claims also requires that the header is concatenated onto the multichannel-spread-spectrum signal, that is to say onto the signal produced by the combining of the plurality of spread-spectrum channels. As such, each of the independent claims requires that the one header is concatenated onto the combined multichannel-spread-spectrum signal containing the plurality of spread-spectrum processed sub-data-sequence channels. Moses adds a header to each individual data transmission after spreading, but not to a combination of spread data signals as presently claimed. Consequently, any combination of Moses with Schilling '951 would teach an artisan to add a header (from Moses) to each individual spread-spectrum processed sub-data-sequence channel (from Schilling '951) before combining those channels. As a result, the proposed combination of Schilling '951 with Moses would not actually produce a packet-spread-spectrum signal with the claimed header concatenated onto the combined multichannel-spread-spectrum signal containing the plurality of spread-spectrum processed sub-data-sequence channels, as claimed.

Applicant also submits that the proposed combinations, based on Moses as a teaching to use a header, would not have been obvious in the sense of 35 U.S.C. § 103. The Moses document is not analogous art, therefore one skilled in the art would not have been taught to combine the Moses document in the manner suggested in the latest art rejections.

A more detailed discussion of these reasons for withdrawing the art rejections follows.

In the application of a rejection under 35 U.S.C. §103, it is incumbent upon the Examiner to factually support a conclusion of obviousness. ***In re Mayne,*** 104 F.3d 1339, 41 USPQ2d 1451 (Fed. Cir. 1997***); In re Oetiker***, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). As stated in ***Graham v. John Deere Co.*** 383 U.S. 1, 13, 148 USPQ 459, 465 (1966), obviousness under 35 U.S.C. §103 must be determined by considering (1) the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims in issue; and (3) resolving the level of ordinary skill in the pertinent art.

Ascertaining the differences between the prior art and the claims in issue necessarily involves construing the claims and comparison of the properly construed claims to the closest prior art. Hence, The first step in any validity (patentability) analysis is claim construction. ***See e.g. Sibia Neurosciences, Inc. v. Cadus Pharma. Corp.***, 225 F.3d 1349, 55 USPQ2d 1927 (Fed. Cir. 2000). Only when a claim is properly understood can a determination be made whether the prior art anticipates and/or renders obvious the claimed invention. ***Amazon.com, Inc. v. Barnesandnoble.com, Inc.***, docket no. 00-1109 (Fed. Cir. February 14, 200100-1109). Claim construction involves consideration of the actual wording of the claim and interpretation thereof in light of Applicants' disclosure.

The PTO is charged with the initial burden of identifying a source in the applied prior art for: (1) claim features; and (2) the realistic requisite motivation for combining applied

references to arrive at the claimed invention with a reasonable expectation of successfully achieving a specific benefit. ***Smith Industries Medical Systems v. Vital Signs,*** 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999). This burden is not met if there is no showing that the combination of references would actually meet all the limitations of the properly construed claims under consideration.

The Examiner also must provide a reason why one having ordinary skill in the art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. ***Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.***, 776 F.2d 281, 227 USPQ 657 (Fed. Cir. 1985); ***In re Fine***, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); ***Stratoflex, Inc. v. Aeroquip Corp.***, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); ***In re Warner***, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967). The Examiner should recognize that the fact that the prior art *could* be modified so as to result in the combination proposed in an effort to meet the claims would not have made the modification obvious unless the prior art suggested the desirability of the modification. ***In re Deminski***, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986). The requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. §103 is not an abstract concept, but must stem from the applied prior art as a whole and have realistically impelled one having ordinary skill in the art to modify a reference in a specific manner to arrive at a specifically claimed invention with a reasonable expectation of achieving a specific benefit. ***In re Newell,*** 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). In the absence of a prior art suggestion for modification of the references, the basis of the rejection is no more than inappropriate hindsight reconstruction using appellant's claims as a guide. ***In re Warner***, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967).

It is submitted that the Examiner has not discharged the burden of establishing obviousness. The combinations of prior patents do not meet the limitations of the properly construed claims. Also, the hindsight reconstructions would not have been obvious under the relevant legal standards.

First, to appreciate the distinction over the combinations, it may be helpful to consider claim 16 as an example of claim interpretation on the relevant points. Claim 16 includes the following method step limitations.

> demultiplexing the stored data into a plurality of sub-data-sequence channels;
>
> spread-spectrum processing the plurality of sub-data-sequence channels by a plurality of chip-sequence signals, respectively, thereby generating a plurality of spread-spectrum channels, with each of the plurality of chip-sequence signals different from other chip-sequence signals in the plurality of chip-sequence signals;
>
> combining the plurality of spread-spectrum channels as a multichannel-spread-spectrum signal;
>
> generating a header comprising a header-symbol-sequence signal spread-spectrum processed with a chip-sequence signal;
>
> concatenating said header to the multichannel-spread-spectrum signal, thereby generating a packet-spread-spectrum signal intended for the receiver;

As shown by the above quotation, this claim clearly recites demultiplexing data into sub-data-sequence channels and spread-spectrum processing the sub-data-sequence channels to generate spread-spectrum channels. The express claim language also specifies a step of combining the spread-spectrum channels to produce a multichannel-spread-spectrum signal. As claimed, a header is generated, and that header comprises a header-symbol-sequence signal spread-spectrum processed with a chip-sequence signal. The next step involves concatenating that header to the multichannel-spread-spectrum signal, thereby generating a packet-spread-spectrum signal for

transmission. As such, the header is concatenated to the combined multichannel-spread-spectrum signal. A single header added to one of the spread-spectrum processed sub-data-sequence channels, or multiple headers with one added to each of those channels, would not satisfy the header-concatenation requirement of claim 16.

As noted above, the technique disclosed by the Schilling '951 patent does not utilize a header. Although the Moses patent does disclose use of headers, Moses actually teaches using one separate header for each data stream and application thereof before the spread-spectrum data signals are attenuated (to select the operative data path) and combined with the audio at 235 (in Fig. 2). In the Moses system, the data signal is input to three separate transmission encoders (see Fig. 2). A wideband spread-spectrum encoder 220 encodes the data signal as a wideband direct sequence spread-spectrum signal at processing gains and levels related to noise masking opportunities as determined by the neural network 204. The bandlimited spread-spectrum encoder 222 is similar to the encoder 220, except that the encoder 222 produces as a bandlimited direct sequence spread-spectrum signal rather than a wideband signal. An FSK burst encoder 224 generates a data signal as a narrowband FSK modulated signal in either burst or continuous mode. Moses teaches that each of these three separate encoders has a header signal generator, shown at 232, 242 and 254 in Fig. 2. The signal generator 232 adds a PN code header signal to each frame of spread-spectrum encoded data from the modulo-2 encoder 228. Attention is directed to column 6, lines 58-64. Similarly, the signal generators 242 adds a PN code header signal to each frame of spread-spectrum encoded data from the modulo-2 encoder 238. Attention is directed to column 7, lines 20-24. The signal generator 254 adds a header to each frame of data, prior to FSK modulation. Attention is directed to column 7, lines 47-51. Each individual path through the circuitry to the audio channel transmission output at 206b has a separate header generator to separately add an individual header

to each possible sub-channel represented by the alternative processing circuitry, before attenuation (selection) and combination with the audio. These separate headers are added in this manner "to facilitate acquisition of the data at the decoder location(s)." Attention, for example, is directed to column 6, lines 63-64; and column 7, lines 49-51.

Whether you look at the overall teachings of Moses (3 headers for 3 data streams) or take one header generator (232) for one individual stream as in the rejection, Moses still teaches the artisan to provide one header for one individual stream before combining with other channel signals. Inserting headers in individual CDMA signals has been the norm for many years. Normally the individual headers are called "pilot" signals, which are information, incorporated into each CDMA signal in a Time Division Multiplexing (TDM) manner. That is exactly what Moses did. Moses added a header before each frame of each single spread-spectrum processed data. Moses does not concatenate a single header to his combined signal (after 235), since the headers inserted in each substream (channel) need to be further processed within each channel.

Moses' teachings would not have enabled an artisan to deduce the inclusion of a header into the combined signal. An artisan would simply view Moses' teachings, if applicable at all to Schilling, as a regular CDMA transmission method similar to those used in cellular communications when transmitting CDMA signals from a Base Station. In conventional CDMA signals transmitted from a Base Station, as in the Schilling system if modified with Moses' teachings, headers/pilot signals are added to the individual spread channels; and the spread channels (with separate headers) are algebraically combined before being transmitted.

As such, Moses does not provide a teaching that would have fairly led an artisan to concatenate a common header to a group of previously combined spread-spectrum signals, as clearly required by claim 16. If a person skilled in the art were to consider application of such

teachings from Moses to the Schilling '951 system, as suggested by the Examiner, the result would be to add separate header generators (Moses) into Schilling '951 in each data processing path after the XOR gates 103, 173, 183 process the data with the chip signals from generators 102, 172, 173, but before the combination of the spread-spectrum channels by the combiner 105 to form the multichannel-spread-spectrum signal (Schilling '951, Fig. 2). Adding separate headers before combining does not meet the properly construed claim language. Neither Schilling '951 nor Moses fairly suggests concatenating a header to the multichannel-spread-spectrum signal produced by combining the spread-spectrum channels, as required by claim 16.

Since, the Schilling '951 and Moses patents, even if combined, would not satisfy all limitations of independent claim 16, that claim and the claims that depend therefrom (including rejected claims 20-26) are patentably distinct over the combination of references proposed in the rejection.

Independent claim 27 specifies a combiner means for combining the spread-spectrum channels as a multichannel-spread-spectrum signal. A header means then concatenates a header to the multichannel-spread-spectrum signal. For reasons discussed in detail above, the combination of the Schilling '951 and Moses patents would not result in a system with a header means to add the specified header signal onto a multichannel-spread-spectrum signal produced by combining the spread-spectrum channels. Hence, the combination of those two patents also fails to meet all of the limitations of independent claim 27. Claim 27 and the claims that depend therefrom (including rejected claims 31-37) are patentably distinct over the combination of references proposed in the rejection.

The packet transmitter of independent claim 38 includes a combiner, which combines the spread-spectrum channels as a multichannel-spread-spectrum signal. A header device concatenates

a header to the multichannel-spread-spectrum signal, to provide the packet-spread-spectrum signal intended for the receiver. For reasons discussed in detail above, the combination of the Schilling '951 and Moses patents would not result in a system with a device to concatenate the specified header signal onto a multichannel-spread-spectrum signal produced by combining the spread-spectrum channels. Hence, the combination of those two patents also fails to meet all of the limitations of independent claim 38. Claim 38 and the claims that depend therefrom (including rejected claims 42-50) are patentably distinct over the combination of references proposed in the rejection.

In addition, it is submitted that the Moses patent is not really analogous art. The subject matter at issue here relates to methods and equipment for wireless packet communication using multiplexing and spread-spectrum processing. The Schilling '951 patent does relate to a multiplexing and spread-spectrum processing technology, similar to that of the present case, but the Schilling '951 patent does not teach concatenating the header to the multichannel-spread-spectrum signal. Rather than relating to art that is analogous to the claims or to Schilling '951, Moses relates to imperceptible transmission of data over an audio channel, simultaneous with audio communication on the same channel. Although Moses discloses spreading, the point of the spreading in Moses is to make the data imperceptible to a person hearing the audio from the channel, i.e. for "noise masking" (see e.g. column 3, lines 54-59; and column 6, lines 43-47). The advantages that Moses emphasizes relate to increased processing gain attained by using a neural network to determine the perceptual entropy envelope of to audio channel, an alleged increase in the data rate from transmitting the data in a "partial response" mode, and using a neural network to recover the data signal at the decoder. Other alleged advantages relate to use of the FSK burst encoder to "punch through" most compression algorithms. Attention is directed

to column 4, lines 50-65 of Moses. These advantages all relate specifically to multiplexed communication of data together with audio in a manner that makes the data imperceptible to the user. Such an art and any advantages relating specifically thereto would not have provided a general teaching to an artisan that would seem readily applicable to other types of communication, such as the multiplexed packet communication of Schilling '951 or of the type disclosed in the present application.

It is respectfully submitted that one of ordinary skill in the art, familiar with the multiplexing and spread-spectrum processing of Schilling '951, would not have looked to the simultaneous transmissions of data and audio in Moses for ways to improve the performance of the Schilling '951 system. As such, the skilled artisan would not have considered the non-analogous teachings of Moses, and the alleged combination of Moses with Schilling '951 would not have been obvious.

As recognized by the inventors in this case, a problem with the '951 system is that it does not permit all transmitters and receivers to readily use identical chip-sequence signals, yet maintain network integrity. This problem has nothing to do with imperceptible data communicated together with audio information.

As disclosed herein, the header provides chip-sequence synchronization at the receiver. Timing for the present invention may be triggered from the header as part of the packet-spread-spectrum signal. For the case of the packet-spread-spectrum signal, each packet has the header followed in time by the multichannel-spread-spectrum signal. The header and multichannel-spread-spectrum signal are sent as the packet-spread-spectrum signal, and the timing for the multichannel-spread-spectrum signal, and thus the data, in the packet-spread-spectrum signal is keyed from the header. The chip-sequence signal used for the header and data is common to all users. The use of a

common chip-sequence signal achieves low cost, since circuitry for changing chip-sequence signals is not required.

Moses does not address the problem found with regard to the Schilling '951 system. Also, these advantages achieved by Applicants' use of the header would not have been apparent to a skilled artisan from the teachings of Moses.

It is respectfully submitted that the only teaching, suggestion or motivation to add a header to the multichannel-spread-spectrum signal in the Schilling '951 system, in the manner specified in Applicant's three independent claims, comes from Applicants' specification and claims. Such hindsight reconstruction is improper, and the rejection of the claims based on such an analysis should be withdrawn for this additional reason.

Hence, the combination of Schilling '951 with Moses does not meet the limitations of the independent claims and in fact would not have been obvious because Moses relates to non-analogous art. The rejection of claims 16, 20-27, 31-38 and 42-50 under 35 U.S.C. § 103 as unpatentable therefore is improper and should be withdrawn.

It is further submitted that the proposed additions selected from the Kim '256 patent and the Schilling '967 patent to address certain limitations recited in various dependent claims would not make up for the noted deficiencies in the basic combination of Schilling '951 and Koyanagi '486. For example, the addition of encoding, scrambling or encrypting, as in the rejection of claims 17-19, 28-30 and 39-41, would still not result in a method or an apparatus that produced the claimed packet-spread-spectrum signal with the specified header symbol concatenated onto the multichannel-spread-spectrum signal, that is to say onto the previously combined group of spread-spectrum-processed signals. Hence, the combination cited in the rejection would still not meet all the limitations of claims 17-19, 28-30 and 39-41. The combination, at least to the extent that it is

based on Moses, also would not have been obvious. For at least these reasons, the rejection of claims 17-19, 28-30 and 39-41, as unpatentable over Schilling '951 and Moses further in combination with the Schilling '967 patent and the Kim '256 patent, should also be withdrawn.

Conclusions

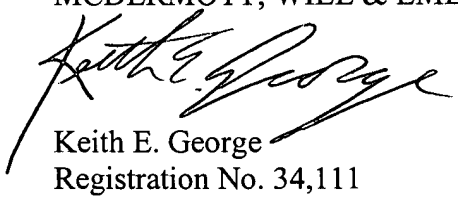
For reasons discussed in detail above, pending claims 16-50 all patentably distinguish over the applied art. The rejections thereof should be withdrawn. The latest Action raised no other issues, therefore, this application should be in condition for allowance. A prompt reconsideration and an early indication of allowability of claims 16-50 are respectfully requested.

It is believed that this response addresses all issues raised in the December 4, 2002 final Office Action. However, if any further issue should arise that may be addressed in an interview or obviated by an Examiner's amendment, it is requested that the Examiner telephone Applicants' representative at the number shown below.

To the extent necessary, if any, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

MCDERMOTT, WILL & EMERY



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Marked-Up Copy of Amended Claim

Claim 16 has been amended as shown by the bracketing (deletions) and underlining (additions) in the copy thereof that follows.

16. (Twice Amended) A method, using a packet transmitter, comprising the steps of:

storing input data intended for a receiver, as stored data;

demultiplexing the stored data into a plurality of sub-data-sequence channels;

spread-spectrum processing the plurality of sub-data-sequence [signals] channels by a plurality of chip-sequence signals, respectively, thereby generating a plurality of spread-spectrum channels, with each of the plurality of chip-sequence signals different from other chip-sequence signals in the plurality of chip-sequence signals;

combining the plurality of spread-spectrum channels as a multichannel-spread-spectrum signal;

generating a header comprising a header-symbol-sequence signal spread-spectrum processed with a chip-sequence signal;

concatenating [a] said header to the multichannel-spread-spectrum signal, thereby generating a packet-spread-spectrum signal intended for the receiver[, the header comprising a header-symbol-sequence signal spread-spectrum processed with a chip-sequence signal]; and

transmitting on a carrier frequency using radio waves, the packet-spread-spectrum signal over a communications channel.